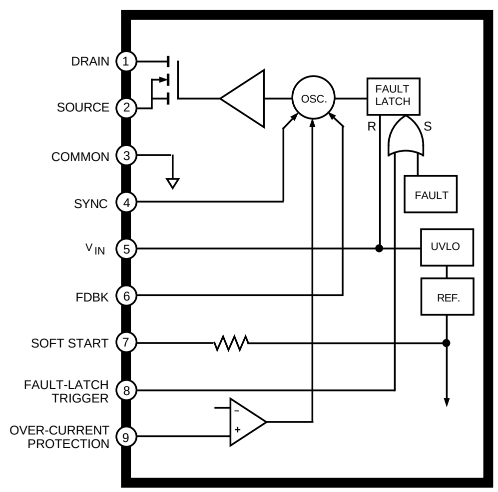
INTERIM DATA SHEET
(Subject to change without notice)
August 18, 1994

STR-S6525

Data Sheet
28102.11

OFF-LINE SWITCHING REGULATOR – WITH POWER MOSFET OUTPUT



Dwg. PK-002-1

ABSOLUTE MAXIMUM RATINGS

Supply Voltage, V_{IN} .... 35 V
Drain-Source Voltage, V_{DS} .... 600 V
Continuous Drain Current, I_D .... 6.0 A
1 ms Single-Pulse Drain Current,
I_{DM} .... 24 A
Single-Pulse Avalanche Energy,
E_A .... 400 mJ
Feedback Input Current, I_{FDBK} .... 20 mA
Fault-Latch Trig. Input Current, I_{FL} 1.0 mA
dc ≤ 25%, I_{FLM} .... -50 mA
Soft-Start Output Current, I_{SS} .... -3.0 mA
Over-Current Protection Voltage,
V_{OCP} .... 3.5 V
Insulation Voltage,$V_{WM(RMS)}$ .... 2000 V
Package Power Diss., P_D .... See Graph
FET Junction Temperature, T_J ...... +150°C
Internal Frame Temperature, T_F ... +125°C
Operating Temperature Range,
T_A .... -20°C to +125°C
Storage Temperature Range,
T_{stg} .... -30°C to +125°C

The STR-S6525 is specifically designed to meet the requirement for increased integration and reliability in off-line flyback converters operating in a constant OFF-time mode. The device incorporates the primary control and drive circuit with a discrete avalanche-rated high-voltage power MOSFET.

Crucial system parameters such as maximum ON time and OFF time are fixed during manufacture. Local control circuit decoupling and layout are optimized within the device.

Cycle-by-cycle current limiting, soft start, under-voltage lock-out with hysteresis, over-voltage protection, and thermal shutdown protect the device during all normal and overload conditions. Over-voltage protection, thermal shutdown, or an external fault signal be latched. The dual requirements of dielectric isolation and low transient thermal impedance and steady-state thermal resistance are satisfied in an over-molded single-in-line power package.

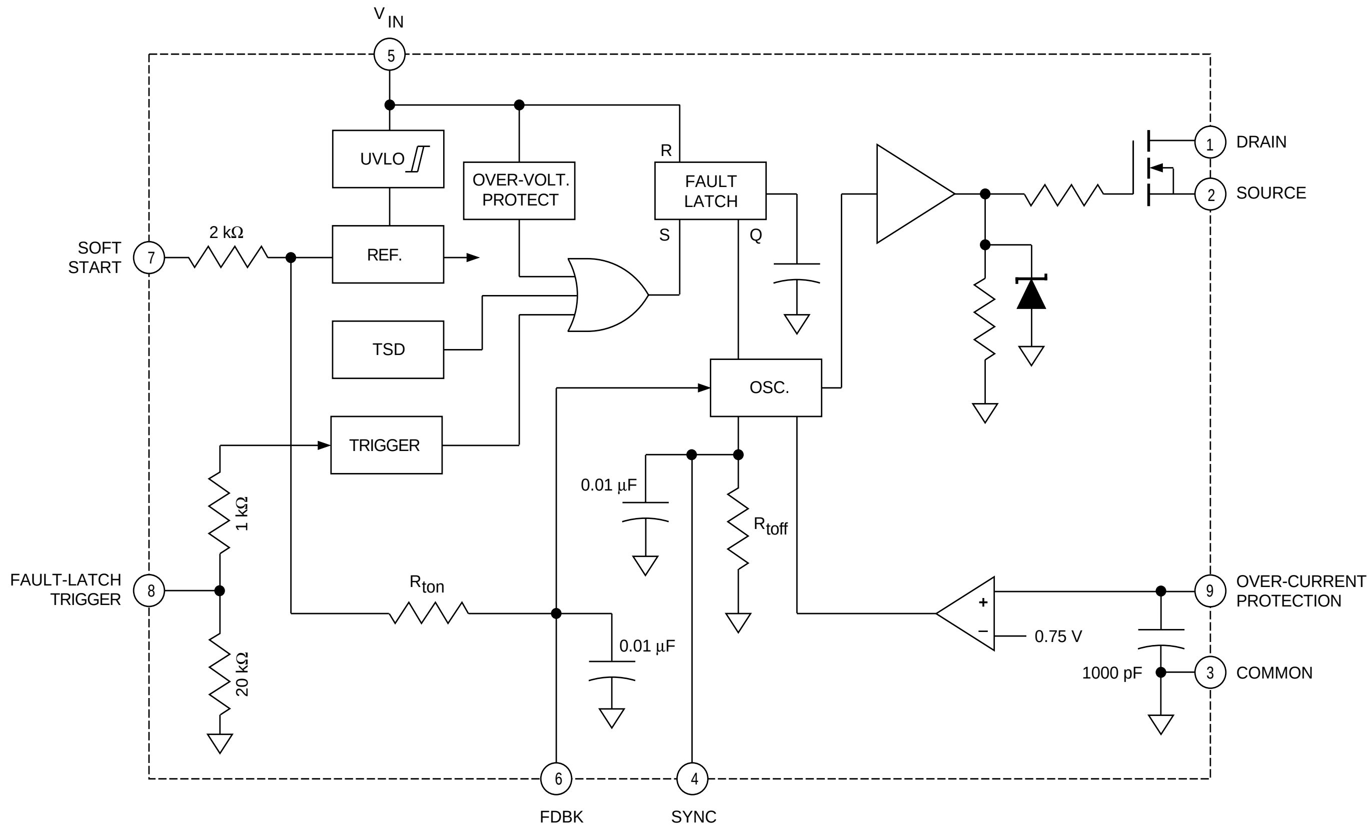
Proven in substantial volumes, this device and its fixed-frequency counterparts represents a significant advance in off-line SMPS reliability growth and integration.

FEATURES

- Constant OFF-Time Converter Operating Mode
- Avalanche-Rated Power MOSFET Switch
- Pulse-by-Pulse Current Limiting
- Latched Over-Voltage and Thermal Protection
- Maximum ON Time and OFF Time Set During Manufacture
- Internal Under-Voltage Lockout with Hysteresis
- Over-Molded SIP with Integral Isolated Heat Spreader
- External Synchronization Capability

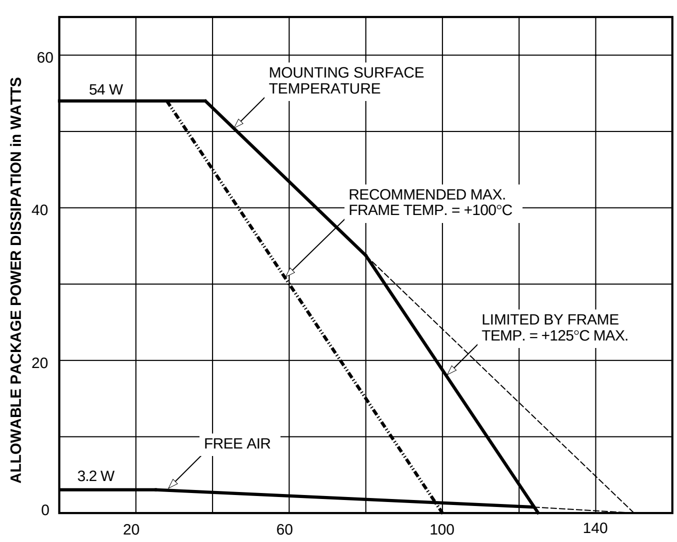
Always order by complete part number: **STR-S6525**.

FUNCTIONAL BLOCK DIAGRAM



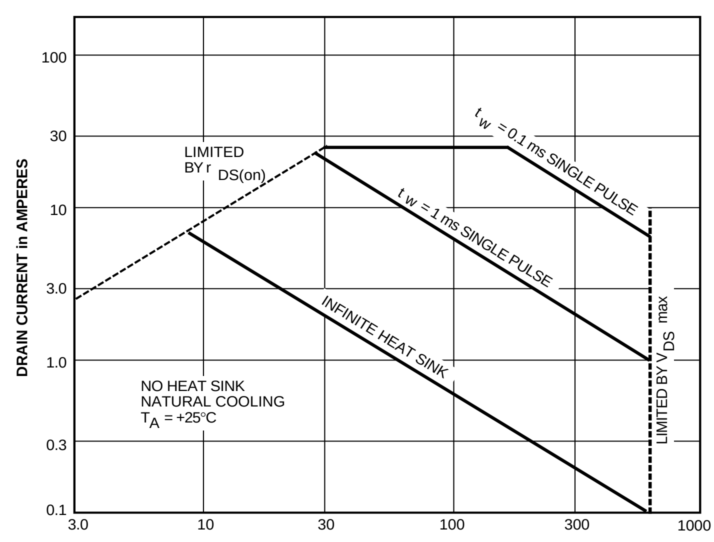
Dwg. FK-002-1

ALLOWABLE PACKAGE POWER DISSIPATION



Dwg. GK-003-2

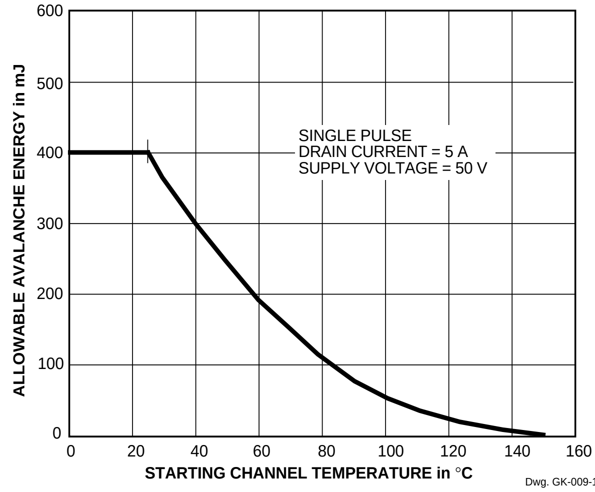
MAXIMUM SAFE OPERATING AREA



Dwg. GK-004-4

Allegro MicroSystems, Inc.
115 Northeast Cutoff, Box 15036
Worcester, Massachusetts 01615-0036 (508) 853-5000

ALLOWABLE AVALANCHE ENERGY

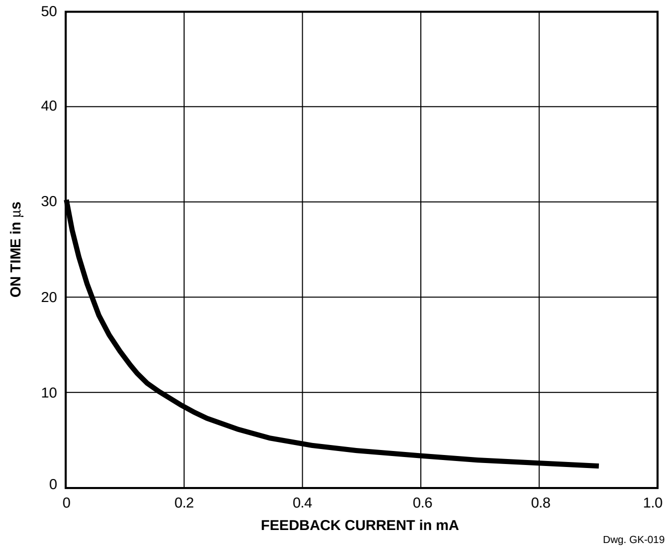


ELECTRICAL CHARACTERISTICS at T_A = +25°C, V_{IN} = 18 V, voltage measurements are referenced to Common (pin 3) (unless otherwise noted).

Characteristic	Symbol	Test Conditions	Limits Min.	Limits Typ.	Limits Max.	Units
On-State Voltage	V_{INT}	Turn-on, increasing V_{IN}	14.4	–	17.6	V
Under-Voltage Lockout	V_{INQ}	Turn-off, decreasing V_{IN}	9.0	–	11	V
Over-Voltage Threshold	$V_{OVP(th)}$		26	–	31	V
FET Leakage Current	I_{DSS}	V_{DS} = 600 V	–	–	300	µA
FET ON Resistance	$r_{DS(on)}$	V_{GS} = 10 V, I_D = 3 A	–	1.0	1.25	Ω
Output Fall Time	t_f	V_{DD} = 200 V, I_D = 5 A, 10% to 90% V_{DS}	–	–	250	ns
Maximum ON Time	t_{on}	I_{FDBK} = 0	27	–	33	µs
Minimum OFF Time	t_{off}		50	–	62	µs
Over-Current Threshold	$V_{OCP(th)}$		700	–	800	mV
Feedback Threshold	$V_{FDBK(th)}$		–	750	–	mV
Soft-Start Voltage	V_{SS}		8.7	–	9.7	V
Sync. Trigger Threshold Volt.	$V_{SYNC(th)}$		–	3.0	–	V
Fault-Latch Trig. Threshold	$V_{FL(th)}$		680	–	880	mV
Fault-Latch Holding Current	I_{INH}	V_{IN} reduced from 31 V to 8.5 V	–	340	400	µA
Fault-Latch Reset Voltage	V_{INQ}	I_{IN} ≤ 20 µA, V_{IN} reduced from 31 V	6.5	–	8.5	V
Insulation RMS Voltage	$V_{WM(RMS)}$	All terminals simultaneous reference metal plate against backside	2000	–	–	V
Supply Current	$I_{IN(ON)}$	Operating	9.0	–	15	mA
	$I_{IN(OFF)}$	Start up, V_{IN} =14 V	–	–	200	µA
Thermal Shutdown	T_J		125	150	–	°C
Thermal Resistance	$R_{\theta JM}$	FET junction to mounting surface	–	2.0	–	°C/W

NOTES: Negative current is defined as coming out of (sourcing) the specified device terminal.
Typical Data is for design information only.

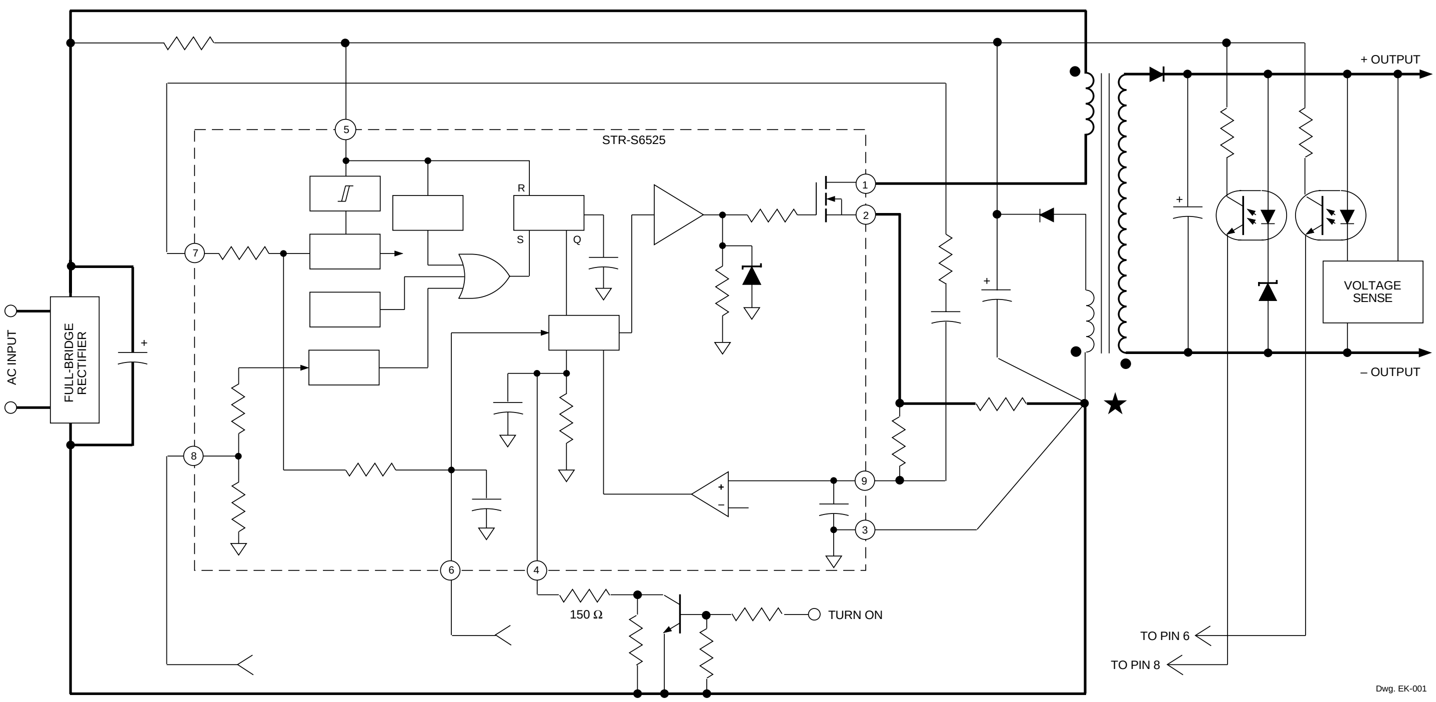
TYPICAL CHARACTERISTICS



115 Northeast Cutoff, Box 15036
Worcester, Massachusetts 01615-0036 (508) 853-5000

TYPICAL APPLICATION

WARNING: lethal potentials are present. See text.



APPLICATIONS INFORMATION

WARNING — These devices are designed to be operated at lethal voltages and energy levels. Circuit designs that embody these components must conform with applicable safety requirements. Precautions must be taken to prevent accidental contact with power-line potentials. Do not connect grounded test equipment.

The use of an isolation transformer is recommended during circuit development and breadboarding.

The power MOSFET outputs of these devices are similar to the International Rectifier type IRFBC40. These devices feature an excellent combination of fast switching, ruggedized device design, low on-resistance, and cost effectiveness.

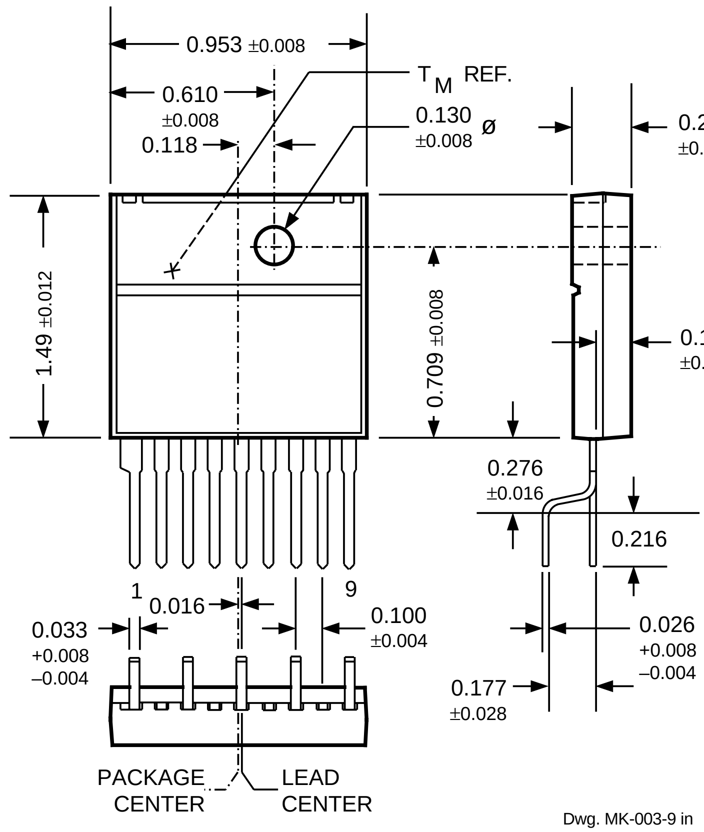
Recommended mounting hardware torque:

4.34 – 5.79 lbf•ft (6 – 8 kg•cm or 0.588 – 0.784 Nm).

Recommended metal-oxide-filled, alkyl-degenerated oil base, silicone grease:

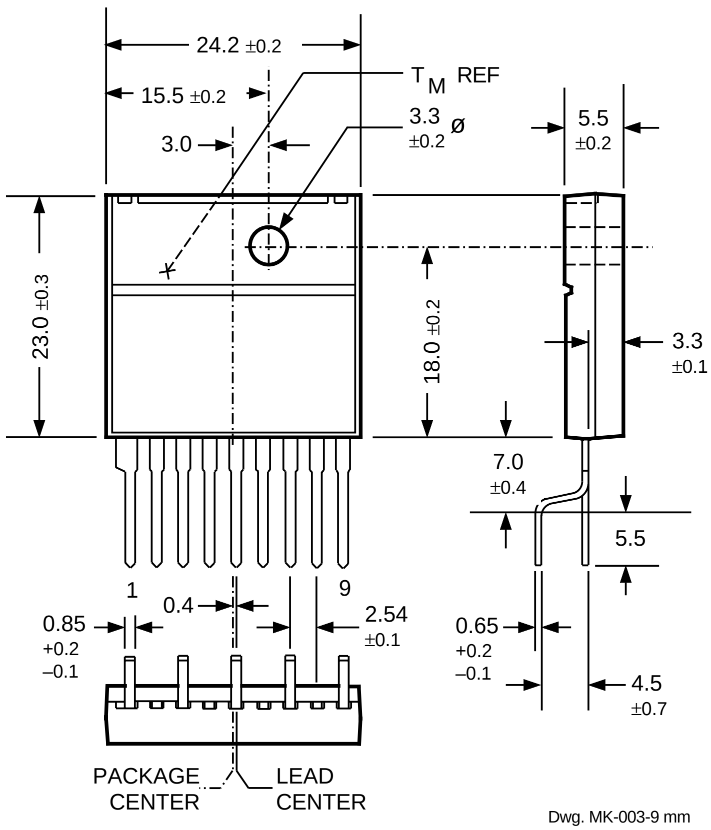
Dow Corning 340, or equivalent

Dimensions in Inches
(Based on 1 mm = 0.03937")



NOTE: Exact body and lead configuration at vendor’s option within limits shown.

Dimensions in Millimeters



NOTE: Exact body and lead configuration at vendor's option within limits shown.

POWER CONVERSION/POWER MANAGEMENT SELECTION GUIDES

SWITCHING REGULATOR PMCMs

Part Number*	Application	AC In	Max P_O	Power Switch		
5703	Quasi-Resonant Flyback Converter	110/120 V	140 W	500 V	6 A	Bipolar
5707	Quasi-Resonant Flyback Convertter	85-265 V 220/240V	90 W 140 W	850 V	6 A	Bipolar
5708	Quasi-Resonant Flyback Converter	85-265 V 220/240 V	120 W 180 W	850 V	7.5 A	Bipolar
6511	Quasi-Resonant Flyback Converter	110/120 V	180 W	450 V	11 A	MOSFET
6703	Quasi-Resonant Flyback Converter	110/120V	140 W	500 V	6 A	Bipolar
6704	Quasi-Resonant Flyback Converter	110/120 V	100 W	500 V	5 A	Bipolar
6707	Quasi-Resonant Flyback converter	85-265 V 220/240 V	90 W 140 W	850 V	6 A	Bipolar
6708	Quasi-Resonant Flyback Converter	85-265 V 220/240 V	120 W 180 W	850 V	7.5 A	Bipolar
6709	Quasi-Resonant Flyback Converter	85-265 V 220/240 V	160 W 220 W	850 W	10 A	Bipolar

* Complete part number includes additional characters to indicate operating temperature range and package style.

LINEAR REGULATOR ICs

Part Number*	V_O	Max DC In	Max Dropout	Max I_O	Package
8184	3.0 V	10 V	300 mV @ 125 mA	250 mA	SOT-89
8187	3.3 V	10 V	300 mV @ 125 mA	250 mA	SOT-89
8188	2.5–3.3 V	10 V	300 mV @ 125 mA	250 mA	SOT-89
8188	2.5–3.3 V	10 V	300 mV @ 125 mA	250 mA	SOIC

* Complete part number includes additional characters to indicate operating temperature range and package style.

Also — 83145 and 84145 Latched, Universal Input-Voltage Switches.